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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/977,732	10/15/2001	David W. Warren	12,318	2953

7590 06/30/2004

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EXAMINER

LEUNG, JENNIFER A

ART UNIT

PAPER NUMBER

1764

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/977,732

Applicant(s)

WARREN, DAVID W.

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) 1-42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 43-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-48 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's amendment(s) submitted on April 2, 2004 and March 3, 2004 have been received and carefully considered. Claims 1-42 are withdrawn from further consideration, being drawn to a non-elected invention. Claims 43-48 remain active.

Response to Arguments filed March 3, 2004

2. Applicant's amendments and corresponding arguments with respect to the rejection of claims 43-48 under 35 U.S.C. 102(b) as being anticipated by Voecks (US 4,909,808) have been fully considered. In view of the amendments to the claims, Applicant has overcome said prior art, and therefore said rejection has been withdrawn.

3. Applicant's amendments and corresponding arguments with respect to the rejection of claims 43-46 under 35 U.S.C. 102(b) as being anticipated by Shirasaki et al. (US 5,639,434), and the rejection of claims 47 and 48 under 35 U.S.C. 103(a) as being unpatentable over Shirasaki et al. in view of Voecks, have been fully considered. However, the arguments are now moot in view of the new ground(s) of rejection, as necessitated by the amendments to the claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 43-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Shirasaki et al. (US 5,639,434).

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Regarding claim 43, Shirasaki et al. (i.e., the embodiment of FIG. 13 and 14; see also FIG. 10 for identification of corresponding structural elements; column 17, line 55 to column 19, line 65) discloses an apparatus comprising:

- a) a straight tubular outer conduit (i.e., defined by intermediate cylinder **116**) concentrically disposed around an inner conduit (i.e., defined by inner cylinder **118**) to form a reaction chamber (i.e., second annulus **126** having closed bottom **124**) containing catalyst (i.e., reforming catalyst **A**) in the annular space between the outer conduit wall **116** and the inner conduit wall **118** (see column 17, line 66 to column 18, line 15), and an inner annular conduit defined path (i.e., double-walled hydrogen permeable cylinder **134** defining a third annulus **133**; column 18, lines 16-23) for the return flow of reactant gases (i.e., permeated hydrogen) to an exit means (i.e., hydrogen outlet **156**); said path **134** located between radially spaced inner and outer annular regions of catalyst **A** (i.e., inner catalyst layer **127**; outer catalyst layer **129**) in reaction chamber **126** (see column 19, lines 31-37); said reaction chamber **126** having one end that extends into a combustion chamber (i.e., as illustrated in FIG. 13, the lower end of the reaction chamber **126** extends into the combustion chamber, wherein the combustion chamber comprises the inner cylinder space **122** of outer cylinder **114** having bottom **112**) and an opposite end that extends outside of the combustion chamber (i.e., as illustrated in FIG. 13, the upper end of the reaction chamber **126**), and there being inlet means (i.e., raw material gas inlet **154**) in communication with said catalyst inner **127** and outer **129** regions, and wherein said exit means **156** is in communication with the inner conduit defined path **134**;
- b) a radiant burner (i.e., drooping combustion burner **146**; column 18, lines 45-51) vertically

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- disposed within said combustion chamber **122** for promoting the combustion of fuel (i.e., from tube **148**) and oxidant (i.e., from tube **150**), in order to radiate heat energy to the catalyst containing reaction chamber **126** that extends annularly about burner **146**; and
- c) a convection chamber (i.e., first annulus **120**) extending about a portion of the reaction chamber **126** containing inner **127** and outer **129** annular regions of catalyst **A** and in proximity to said inlet means **154** and to said exit means **156**; said inner conduit wall **118**, said outer conduit wall **116** and said reaction chamber **126** projecting annularly into said convection chamber **120** proximate an annular entrance of gases into the reaction chamber **126** (column 18, lines 52-57).

Although not shown in FIG. 13, Shirasaki et al. further discloses a heat radiating surface comprising a gas permeable zone (i.e., a radiating body with porous walls **62**, FIG. 5; similarly, walls **462** and **662** in FIG. 19 and 25, respectively) is advantageously installed in the inner cylinder space of the combustion chamber (i.e., space **122**) so as to surround the flame of the dropping combustion burner **146**, thereby ensuring a virtually uniform temperature distribution and an almost uniform heat flux to the reaction chamber **126** (column 15, lines 34-44).

Regarding claim 44, Shirasaki et al. (i.e., the embodiment of FIG. 13 and 14; see also FIG. 10 for identification of corresponding structural elements; column 17, line 55 to column 19, line 65) discloses the apparatus comprising a multiplicity of reaction chambers (i.e., the inner annular reaction chamber **127** and the outer annular reaction chamber **129**), concentrically disposed around said radiant burner **146** having a 360° radiant arc by virtue of the cylindrical surface of radiating body **62/462/662** (see FIG. 5, 19, 25).

Regarding claim 45, Shirasaki et al. (i.e., the embodiment of FIG. 13 and 14; see also

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FIG. 10 for identification of corresponding structural elements; column 17, line 55 to column 19, line 65) discloses said convection chamber **120** comprises an inlet means (i.e., the entry space between the bottom section **112** and the annular section **124**; column 18, lines 52-55) in communication with the combustion chamber **122** and an exit means (i.e., combustion gas outlet **152**) outside the combustion chamber **122**.

Regarding claim 46, Shirasaki et al. (i.e., the embodiment of FIG. 13 and 14; see also FIG. 10 for identification of corresponding structural elements; column 17, line 55 to column 19, line 65) discloses the reaction chamber **126** has opposite sides, wherein the reactant gases flowing inside the inner annular conduit **134** inherently transfer heat to the reaction chamber **126** via direct thermal contact with walls **128** and **130**.

Instant claims 43-46 structurally read on the apparatus of Shirasaki et al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki et al. (US 5,639,434) in view of VoECKs (US 4,909,808).

Shirasaki et al. discloses the radiant burner, "should preferably have a porous wall so that the combustion gas can flow through the porous wall to efficiently heat the radiating body," (column 11, lines 27-29), but is silent as to the burner comprising, specifically, a supported metal or supported ceramic fiber material. In any event, it would have been obvious for one of

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ordinary skill in the art at the time the invention was made to select an appropriate material, such as the recited metal and ceramic fiber materials, for the radiant burner of Shirasaki et al. because the use of such materials for radiating heat in burner-type applications is well known in the art, as evidenced by Voecks et al., who teaches a combustor comprising, "a fibrous material composed of alumina, silica, or other similar and commonly used oxide material," or "a 'sponge' type of material which can be metallic or oxide material with varying but generally small pore, high porosity material," column 2, lines 55-63). Furthermore, the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

* * *

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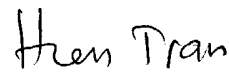
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung

June 24, 2004



HIEN TRAN
PRIMARY EXAMINER